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LONG LAKE, HAMILTON COUNTY, NEW YORK

Pacific Northwest Environmental
Research Laboratory

Prepared for:

National Environmental Research Center
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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivded according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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REPORT

ON

LONG LAKE

HAMILTON COUNTY

NEW YORK

EPA REGION II

WORKING PAPER No. 161

WITH THE COOPERATION OF THE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AND THE

NEW YORK NATIONAL GUARD

DECEMBER, 1974

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the New York Department of Environmental Conservation for professional involvement and to the New York National Guard for conducting the tributary sampling phase of the Survey.

Henry L. Diamond, Commissioner of the New York Department of Environmental Conservation, and Leo J. Hetling, Director, and Italo G. Carcich, Senior Sanitary Engineer, Environmental Quality Research, Department of Environmental Conservation, provided invaluable lake documentation and counsel during the Survey.

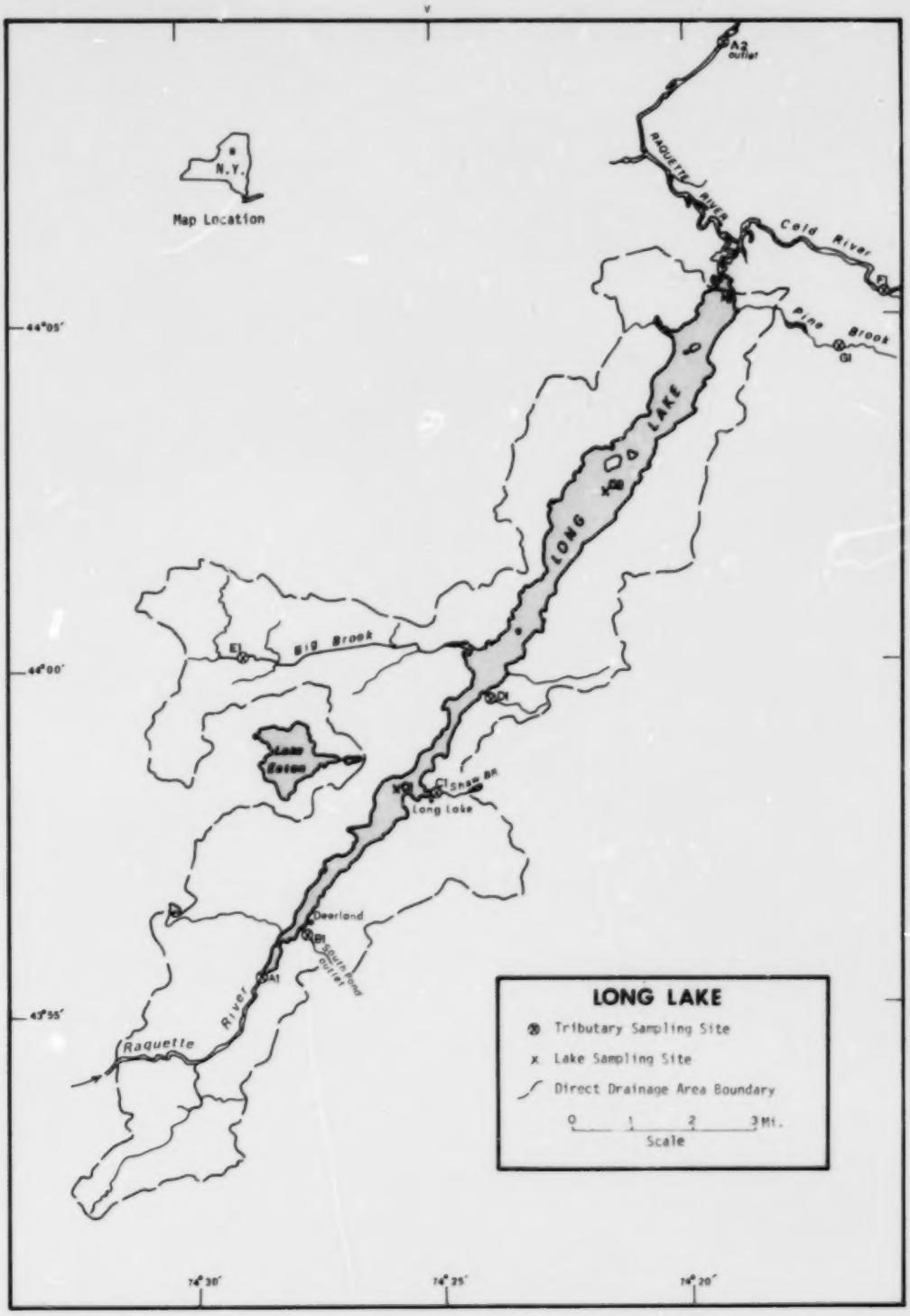
Major General John C. Baker, the Adjutant General of New York, and Project Officer Lieutenant Colonel Fred Peters, who directed the volunteer efforts of the New York National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF NEW YORK

LAKE NAME	COUNTY
Allegheny Reservoir	Cattaraugas, NY; McLean, Warren, PA
Black	St. Lawrence
Canadaigua	Ontario
Cannonsville	Delaware
Carry Falls	St. Lawrence
Cassadaga	Chautauqua
Cayuga	Seneca, Tompkins
Champlain	Clinton, Essex, NY; Addison, Chittenden, Franklin, VT
Chautauqua	Chautauqua
Conesus	Livingston
Cross	Cayuga, Onondaga
Goodyear	Otsego
Huntington	Sullivan
Keuka	Ontario
Long	Hamilton
Lower St. Regis	Franklin
Otter	Cayuga
Owasco	Cayuga
Raquette Pond	Franklin
Round	Saratoga
Sacandaga Res.	Fulton, Saratoga
Saratoga	Saratoga
Schroon	Essex, Warren
Seneca	Seneca, Schyler, Yates
Swan	Sullivan
Swinging Bridge Res.	Sullivan


N.Y.
Map Location
A2 outlet
RAQUETTE RIVER
Cold River
Pine Brook
LONG LAKE
Big Brook
Lake Eaton
Clear Pond
Long Lake
Deerland
South Pond Outlet
A1
Raquette River
44°05'
44°00'
43°55'
74°30'
74°25'
74°20'
LONG LAKE
Tributary Sampling Site
Lake Sampling Site
Direct Drainage Area Boundary
0 1 2 3 Mi.
Scale

LONG LAKE

STORET NO. 3619

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Long Lake is mesotrophic. Of the 26 New York lakes sampled in the fall of 1972, four had less mean total phosphorus, only one had less mean dissolved phosphorus, and five had less mean inorganic nitrogen. For all New York data, four lakes had less mean chlorophyll a, and seven had greater Secchi disc transparency.

B. Rate-Limiting Nutrient:

Significant losses of nutrients occurred in the assay sample from the time of collection to the beginning of the assay, and the results are not indicative of lake conditions when the sample was collected. However, the lake data indicate that the lake was limited by phosphorus (i.e., N/P ratios on all occasions were equal to or greater than 36/1).

C. Nutrient Controllability:

1. Phosphorus "loss"--During the sampling year, there was an unexpected apparent loss of phosphorus from Long Lake; i.e., nearly 20% more phosphorus was measured leaving the lake than can be accounted for by all measured and estimated inputs (see page 10).

The cause of the marked phosphorus imbalance is not known, but it not likely that a phosphorus "wash-out" occurred or that a direct-discharge point source contributing 3,200 lbs of phosphorus during

the year was overlooked. Some portion of the "loss" may have been due to the location of the "outlet" sampling station some five+ stream miles below the actual lake outlet or to the limits of accuracy of the flow estimates provided by the U.S. Geological Survey, or both.

2. Point source loads--Considering the phosphorus load leaving the lake to be at least equivalent to combined input loads, it is calculated that Long Lake received a total phosphorus load at a rate of 0.54 $g/m^2/yr$ which is less than that proposed by Vollenweider (in press) as "permissible"; i.e., an oligotrophic rate (see page 12). It will be noted that an even more favorable loading rate results when calculated on the basis of the input loads.

Since the only known point-sources (shoreline septic tanks) contributed less than 2% of the estimated total phosphorus load during the sampling year, it is concluded that point-source control would have little effect on the trophic condition of Long Lake.

3. Non-point source loads (see page 12)--During the sampling year, the phosphorus exports of the Long Lake tributaries were relatively low and compared favorably to the exports of unimpacted New York streams studied elsewhere.

In all, it is calculated that non-point sources contributed nearly 99% of the total phosphorus load to Long Lake.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

A. Lake Morphometry†:

1. Surface area: 4,090 acres.
2. Mean depth: unknown.
3. Maximum depth: >17 feet.
4. Volume: unknown.
5. Mean hydraulic retention time: unknown.

B. Tributary and Outlet:
(See Appendix A for flow data)

1. Tributaries -

Name	Drainage area*	Mean flow*
Raquette River	191.0 mi^2	381.2 cfs
South Pond Outlet	21.3 mi^2	42.5 cfs
Shaw Brook	5.5 mi^2	11.1 cfs
Unnamed stream (D-1)	0.7 mi^2	1.3 cfs
Big Brook	40.0 mi^2	79.7 cfs
Cold River	84.6 mi^2	168.8 cfs
Pine Brook	4.8 mi^2	9.5 cfs
Minor tributaries & immediate drainage -	116.7 mi^2	245.5 cfs
Totals	464.6 mi^2	939.6 cfs

2. Outlet -

Raquette River	471.0 mi^2**	939.6 cfs

C. Precipitation***:

1. Year of sampling: 49.0 inches.
2. Mean annual: 40.0 inches.

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† Greeson and Robison, 1970.
* Drainage areas are accurate within ±5%, except for small basins (±10%); mean daily flows are accurate within ±5 to 25%; and normalized mean monthly flows are accurate within ±15%.
** Includes area of lake.
*** See Working Paper No. 1, "Survey Methods".

III. LAKE WATER QUALITY SUMMARY

Long Lake was sampled three times during the open-water season of 1972 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on the lake and from two or more depths at each station (see map, page v). During each visit, a single depth-integrated (15 feet or near bottom to surface) sample was composited from the two stations for phytoplankton identification and enumeration; and during the last visit, a single five-gallon depth-integrated sample was composited for algal assays. Also, the first two visits, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 11 feet at station 1 and 17 feet at station 2.

The results obtained are presented in full in Appendix B, and the data for the fall sampling period, when the lake essentially was well-mixed, are summarized below. Note, however, the Secchi disc summary is based on all values.

For differences in the various parameters at the other sampling times, refer to Appendix B.

A. Physical and chemical characteristics:

Parameter	Minimum	Mean	Median	Maximum
		FALL VALUES (10/06/72)		
Temperature (Cent.)	11.6	11.7	11.7	11.9
Dissolved oxygen (mg/l)	8.8	9.0	9.1	9.1
Conductivity (μmhos)	<50	<50	<50	<50
pH (units)	6.6	6.7	6.7	6.8
Alkalinity (mg/l)	<10	<10	<10	<10
Total P (mg/l)	0.006	0.009	0.008	0.014
Dissolved P (mg/l)	0.003	0.004	0.004	0.005
NO_2 + NO_3 (mg/l)	0.090	0.090	0.090	0.100
Ammonia (mg/l)	0.060	0.068	0.070	0.080
		ALL VALUES		
Secchi disc (inches)	96	116	108	166

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Number per ml
05/20/72	1. Dinobryon	211
	2. Peridinium	175
	3. Tabellaria	93
	4. Flagellates	51
	5. Anabaena	45
	Other genera	34
	Total	609
07/25/72	1. Chroococcus	265
	2. Merismopedia	127
	3. Raphidiopsis	66
	4. Flagellates	63
	5. Scenedesmus	45
	Other genera	85
	Total	651
10/06/72	1. Flagellates	362
	2. Chroococcus	309
	3. Cyclotella	166
	4. Anabaena	90
	5. Melosira	75
	Other genera	611
	Total	1,613

2. Chlorophyll a -
(Because of instrumentation problems during the 1972 sampling, the following values may be in error by plus or minus 20 percent.)

Sampling Date	Station Number	Chlorophyll a (µg/l)
05/20/72	01	5.8
07/25/72	01	2.3
	02	2.3

C. Limiting Nutrient Study:

Because of nutrient loss in the sample, the algal assay results are not representative of lake conditions at the time the sample was collected. The lake data indicate that the lake was limited by phosphorus; i.e., N/P ratios at all sampling times were 36/1 or greater, and phosphorus limitation would be expected.

IV. NUTRIENT LOADINGS
(See Appendix C for data)

For the determination of nutrient loadings, the New York National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of April and May when two samples were collected. Sampling was begun in November, 1972, and was completed in June, 1973.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the New York District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) and tributaries F-1 and G-1 were estimated by using the means of the nutrient loads, in $lbs/mi^2/year$, in South Pond outlet, Shaw Brook, Unnamed Brook, and Big Brook at stations B-1, C-1, D-1, and E-1 and multiplying by the ZZ or appropriate tributary area in mi^2.

The original outlet sampling site for Long Lake was at Axton Landing, approximately ten miles north of the actual lake outlet location. One tributary sampled, Cold River, does not impact Long Lake but does contribute to the Raquette River outlet loadings. Nutrient loadings from

* See Working Paper No. 1.

this tributary, plus estimated loadings from the watershed surrounding the ten miles to Axton Landing, were subtracted from the outlet loading figures which originally had been computed by the program noted above.

Other than septic tanks, there were no known point sources impacting Long Lake during the sampling year.

A. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	lbs P/ yr	% of total
a. Tributaries (non-point load) -		
Raquette River	7,620	46.5
South Pond Outlet	420	2.6
Shaw Brook	420	2.6
Unnamed Brook (D-1)	30	0.2
Big Brook	1,570	9.6
Pine Brook	200	1.2
b. Minor tributaries & immediate drainage (non-point load) -	5,300	32.3
c. Known municipal - None	-	-
d. Septic tanks* -	200	1.2
e. Known industrial - None	-	-
f. Direct precipitation** -	640	3.8
Total	16,400	100.0

2. Outputs -

Lake outlet - Raquette River 19,600

3. Net annual P loss - 3,200 pounds

* Estimate based on 316 lakeside residences; see Working Paper No. 1.
** See Working Paper No. 1.

B. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	lbs N/ yr	% of total
a. Tributaries (non-point load) -		
Raquette River	654,540	44.2
South Pond Outlet	79,620	5.4
Shaw Brook	22,310	1.5
Unnamed Brook (D-1)	3,040	0.2
Big Brook	156,890	10.6
Pine Brook	19,180	1.3
b. Minor tributaries & immediate drainage (non-point load) -	497,080	33.6
c. Known municipal - None	-	-
d. Septic tanks* -	7,430	0.5
e. Known industrial - None	-	-
f. Direct precipitation** -	39,400	2.7
Total	1,479,490	100.0

2. Outputs -

Lake outlet - Raquette River 1,422,100

3. Net annual N accumulation - 57,390 pounds

* Estimate based on 316 lakeside residences; see Working Paper No. 1.
** See Working Paper No. 1.

C. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	lbs P/mi^2/yr	lbs N/mi^2/yr
Raquette River	40	3,427
South Pond Outlet	20	3,738
Shaw Brook	76	4.056
Unnamed Brook (D-1)	43	4,343
Big Brook	39	3,922

D. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates, based on input loads, are compared to those proposed by Vollenweider (in press). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

	Total Phosphorus		Total Nitrogen	
Units	Total	Accumulated	Total	Accumulated
lbs/acre/yr	4.0	loss*	361.7	14.0
grams/m^2/yr	0.45	-	40.5	1.6

Vollenweider loading rates for phosphorus (g/m^2/yr) based on surface area and mean outflow of Long Lake:

"Dangerous" (eutrophic rate)	1.36
"Permissible" (oligotrophic rate)	0.68

* See discussion on pages 1 and 2.

V. LITERATURE REVIEWED

Greeson, Phillip E., and F. Luman Robison, 1970. Characteristics of New York lakes. Part 1 - Gazateer of lakes, ponds, and reservoir. Bull. 68, U.S. Dept. Int. and NY Dept. Env. Cons., Albany.

Vollenweider, Richard A. (in press). Input-output models. Schweiz. A. Hydrol.

VII. APPENDICES

APPENDIX A

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3619 LONG LAKE

TOTAL DRAINAGE AREA OF LAKE 471.00

TRIBUTARY	SUB-DRAINAGE AREA	NORMALIZED FLOWS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
3619A1	191.00	229.00	178.00	349.00	1170.00	866.00	336.00	183.00	153.00	185.00	264.00	371.00	288.00	381.19
3619A2	471.00	563.68	437.75	860.51	2878.38	2138.79	828.53	450.75	377.79	455.74	651.63	915.48	710.60	939.64
3619B1	21.30	25.50	19.80	38.90	130.00	96.50	37.50	20.40	17.10	20.60	29.50	41.40	32.20	42.47
3619C1	5.55	6.65	5.17	10.10	33.90	25.20	9.77	5.32	4.46	5.37	7.68	10.80	8.38	11.07
3619D1	0.68	0.81	0.63	1.24	4.16	3.08	1.20	0.65	0.55	0.66	0.94	1.32	1.03	1.36
3619E1	40.00	47.90	37.20	73.10	244.00	181.00	70.40	38.30	32.10	38.70	55.40	77.80	60.40	79.73
3619F1	84.60	101.00	78.80	155.00	517.00	384.00	149.00	81.10	68.00	81.90	117.00	164.00	128.00	168.82
3619G1	4.75	5.69	4.42	8.68	29.00	21.50	8.36	4.55	3.82	4.60	6.57	9.24	7.17	9.47
3619ZZ	121.12	147.00	115.00	225.00	752.00	558.00	217.00	118.00	98.90	119.00	170.00	239.00	186.00	245.53

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 471.00
SUM OF SUB-DRAINAGE AREAS = 471.00

TOTAL FLOW IN = 11269.96
TOTAL FLOW OUT = 11269.61

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3619A1	11	72	536.00	4	617.00				
	12	72	310.00	2	326.00				
	1	73	440.00	5	632.00				
	2	73	330.00	6	740.00				
	3	73	925.00	4	110.00				
	4	73	1160.00	15	370.00				
	5	73	919.00	5	865.00	18	1240.00		
	6	73	340.00	3	420.00				
	7	73	258.00	14	133.00				
	8	73	135.00	18	120.00				
	9	73	170.00	7	132.00				
	10	73	99.70	13	89.60				
3619A2	11	72	1320.00	4	1520.00				
	12	72	764.00	2	805.00				
	1	73	1080.00	6	1200.00				
	2	73	812.00	3	971.00				
	3	73	2280.00	3	253.00				
	4	73	2870.00	15	913.00				
	5	73	2270.00	5	2130.00	19	6130.00		
	6	73	839.00	2	1210.00				
	7	73	637.00	7	746.00				
	8	73	335.00	18	297.00				
	9	73	419.00	8	351.00				
	10	73	246.00	13	221.00				

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TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3A19 LONG LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3A19R1	11	72	59.80	4	86.50				
	12	72	34.40	2	45.40				
	1	73	49.00	5	88.50				
	2	73	36.70	6	104.00				
	3	73	103.00	4	15.50				
	4	73	129.00	15	44.50				
	5	73	102.00	5	82.50	18	115.00		
	6	73	38.80	3	39.00				
	7	73	28.80	14	19.70				
	8	73	15.10	18	18.80				
	9	73	18.90	7	19.40				
	10	73	11.10	13	16.40				
3A19C1	11	72	15.60	4	19.20				
	12	72	9.01	2	10.20				
	1	73	12.80	6	15.20				
	2	73	9.59	6	23.80				
	3	73	26.80	4	3.50				
	4	73	33.80	15	8.90				
	5	73	26.70	5	3.60	18	17.00		
	6	73	9.89	3	9.40				
	7	73	7.51	14	5.92				
	8	73	3.94	18	5.75				
	9	73	4.93	7	5.95				
	10	73	2.90	13	5.20				
3A19D1	11	72	1.91	4	2.17				
	12	72	1.11	2	1.15				
	1	73	1.57	5	2.22				
	2	73	1.17	6	2.64				
	3	73	3.28	4	0.39				
	4	73	4.14	15	1.30				
	5	73	3.27	5	3.04	18	4.38		
	6	73	1.21	3	1.48				
	7	73	0.92	14	0.47				
	8	73	0.49	19	0.41				
	9	73	0.61	7	0.47				
	10	73	0.36	13	0.31				
3A19E1	11	72	117.00	4	129.00				
	12	72	64.90	2	68.30				
	1	73	92.10	5	132.00				
	2	73	89.00	6	155.00				
	3	73	19..00	4	23.10				
	4	73	243.00	15	77.50				
	5	73	192.00	5	181.00	18	260.00		
	6	73	71.20	3	87.90				
	7	73	54.10	14	27.90				
	8	73	28.40	19	24.60				
	9	73	35.50	7	27.70				
	10	73	20.90	13	16.70				

LAKE CODE 3619 LONG LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3619F1	11	72	237.00	4	273.00				
	12	72	138.00	2	145.00				
	1	73	194.00	5	280.00				
	2	73	146.00	6	328.00				
	3	73	411.00	4	48.90				
	4	73	515.00	15	164.00				
	5	73	407.00	5	383.00	18	551.00		
	6	73	151.00						
	7	73	114.00						
	8	73	60.20						
	9	73	75.20						
	10	73	44.20						
3619G1	11	72	13.30	4	15.30				
	12	72	7.71	2	8.10				
	1	73	10.90	5	15.70				
	2	73	8.19	6	18.40				
	3	73	23.00	4	2.75				
	4	73	28.90	15	9.19				
	5	73	22.80	5	21.50	18	30.90		
	6	73	8.46						
	7	73	6.40						
	8	73	3.38						
	9	73	4.22						
	10	73	2.48						
3619Z2	11	72	345.00	4	398.00				
	12	72	200.00	2	210.00				
	1	73	283.00	5	407.00				
	2	73	213.00	6	477.00				
	3	73	596.00	4	71.20				
	4	73	749.00	15	239.00				
	5	73	592.00	5	557.00	18	802.00		
	6	73	220.00	3	271.00				
	7	73	167.00	14	85.90				
	8	73	87.50	18	77.60				
	9	73	109.00	7	85.30				
	10	73	64.20	13	57.70				

APPENDIX B

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 74/11/26

361901
43 58 12.0 074 26 00.0
LONG LAKE
36 NEW YORK

11EPALES 2111202
3 0016 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/05/20	09 05	0000	13.4	9.6	99	50		10K	0.300	0.070	0.008	0.005
	09 05	0011	10.5	9.6		50	5.40	10K	0.330	0.080	0.008	0.005
72/07/25	12 00	0000			108	50K	7.30	10K	0.150	0.080	0.008	0.005
	12 00	0004	23.9	7.2		50K	7.10	10K	0.140	0.100	0.006	0.005
	12 00	0010	23.7	6.6		50K	7.10	10K	0.100	0.040	0.007	0.005
72/10/10	14 14	0000			96	50K	6.65	10K	0.090	0.070	0.008	0.004
	14 14	0004	11.6	8.8				10K	0.100	0.080	0.009	0.005

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/05/20	09 05	0000	5.8J
72/07/25	12 00	0000	2.3J

K VALUE KNOWN TO BE LESS THAN INDICATED

J VALUE KNOWN TO BE IN ERROR

STORET RETRIEVAL DATE 74/11/20

361902
44 02 30.0 074 21 06.0
LONG LAKE
36 NEW YORK

11EPALES
3

2111202
0020 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/05/20	09 34	0000	13.4	9.5	120	50	5.40	10K	0.300	0.080	0.007	0.004
	09 34	0017	6.5	10.6		50	5.40	10K	0.360	0.090	0.006	0.005
72/07/25	11 40	0000			108	50K	7.80	10K	0.150	0.070	0.012	0.008
	11 40	0004	23.2	7.4		50K	7.80	10K	0.150	0.060	0.009	0.005
	11 40	0010	23.0	7.4		50K	7.80	10K	0.160	0.090	0.007	0.006
72/10/10	13 45	0000			166	50K	6.60	10K	0.090	0.060	0.006	0.005
	13 45	0004	11.9	9.1		50K	6.70	10K	0.090	0.040	0.008	0.003
	13 45	0011	11.7	9.1		50K	6.75	10K	0.090	0.070	0.014	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/07/25	11 40	0000	2.3J

K VALUE KNOWN TO BE LESS THAN INDICATED

J VALUE KNOWN TO BE IN ERROR

APPENDIX C

TRIBUTARY DATA

STORET RETRIEVAL DATE 74/11/26

3619A1 LS3619A1
43 55 30.0 074 28 30.0
RAQUETTE RIVER
36 15 BLUE MTN
I/LONG LAKE(HAMILTON CO)
BANK OF LGT DUTY RD
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	11 15		0.104	0.230	0.035	0.005K	0.022
72/12/02	09 30		0.147	0.440	0.024	0.005K	0.017
73/01/05	10 40		0.220	0.730	0.060	0.005K	0.005K
73/02/06	09 45		0.294	0.190	0.036	0.006	0.006
73/03/04	10 30		0.360	0.270	0.044	0.005K	0.010
73/03/31	15 00		0.310	0.520	0.023	0.005K	0.005K
73/04/15	09 30		0.273	0.630	0.014	0.005K	0.005K
73/05/05	11 00		0.252	0.270	0.022	0.005K	0.015
73/05/18	19 00		0.470	0.400	0.007	0.005K	0.005K
73/06/03	12 00		0.231	0.820	0.019	0.005K	0.014
73/07/14	14 00		0.132	0.390	0.082	0.005K	0.010
73/08/18	14 00		0.085	2.200	0.147	0.005K	0.010
73/09/07	16 30		0.160	1.680	0.920	0.008	0.010
73/10/13	11 30		0.070	0.420	0.095	0.005K	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

3619A2 LS3619A2
44 12 00.0 074 19 30.0
RAQUETTE RIVER
36 15 LONG LAKE
O/LONG LAKE(HAMILTON CO)
AXTON LANDING
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	15	10	0.089	0.300	0.061	0.006	0.015
72/12/02	15	30	0.138		0.066	0.005K	
73/01/06	09	30	0.340	0.500	0.075	0.005K	0.025
73/02/03	09	00	0.320	0.420	0.050	0.007	0.015
73/03/03	08	00	0.378	2.000	0.072	0.005K	0.010
73/03/31	08	30	0.420	0.360	0.025	0.005K	0.010
73/04/15	08	10	0.360	1.150	0.035	0.005K	0.005K
73/05/05	09	45	0.330	0.270	0.007	0.005K	0.010
73/05/19	11	30	0.300	0.440	0.020	0.005K	0.010
73/06/02	08	15	0.220	0.400	0.015	0.005K	0.005K
73/07/07	10	00	0.176	2.400	0.072	0.005K	0.015
73/08/18	11	30	0.105	0.120	0.022	0.006	0.025
73/09/08	11	00	0.084	0.580	0.058	0.005K	0.010
73/10/13	09	00	0.093	0.310	0.057	0.005K	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

361981 LS361981
43 56 00.0 074 28 00.0
SOUTH POND OUTLET
36 15 BLUE MTN
T/LONG LK(HAMILTON CO)
MED DUTY RD BRDG IN DEERLAND
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	11 40		0.117	0.230	0.075	0.005K	0.005K
72/12/02	09 45		0.280	0.310	0.038	0.005K	0.006
73/02/06	10 04		0.580	0.200	0.094	0.005K	0.005
73/03/04			0.690	1.050	0.083	0.005K	0.005K
73/03/31	15 00		0.730	0.300	0.032	0.005K	0.005K
73/04/15	09 30		0.720	0.840	0.033	0.005K	0.005K
73/05/05	11 00		0.540	0.660	0.012	0.005K	0.005
73/05/18	19 00		0.470	0.600	0.018	0.005K	0.005K
73/06/03	12 00		0.440	0.940	0.023	0.005K	0.005K
73/07/14	14 30		0.250	0.210	0.039	0.005K	0.005K
73/08/18	12 00		0.170	0.660	0.126	0.005K	
73/09/07	16 30		0.147	0.540	0.120	0.005K	0.005K
73/10/13	13 00		0.126	0.690	0.240	0.005K	0.005K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

3619C1 LS3619C1
43 58 00.0 074 25 30.0
SHAW BROOK
36 15 BLUE MTN
T/LONG LAKE(HAMILTON CO)
ST HWY 30 BRDG IN LONG LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	13 15		0.260	0.270	0.069	0.005K	0.010
72/12/02	11 15		0.357	0.540	0.110	0.011	0.018
73/01/06	10 50		0.480	0.420	0.056	0.006	0.009
73/02/06	10 15		0.510	1.050	0.080	0.007	
73/03/04	10 15		0.440	0.420	0.100	0.008	0.020
73/03/31	14 30		0.440	0.240	0.054	0.005K	0.020
73/04/15	10 00		0.370	1.050	0.069	0.005K	0.025
73/05/05	11 00		0.280	0.585	0.029	0.006	0.015
73/05/18	19 00		0.340	0.630	0.016	0.005K	0.010
73/06/03	12 00		0.180	1.100	0.052	0.007	0.015
73/07/14	14 00		0.154	0.450	0.050	0.005K	0.025
73/08/18	13 00		0.168	1.000	0.044	0.006	0.020
73/09/07	16 00		0.120	1.980	0.730	0.006	0.030
73/10/13	11 00		0.132	0.540	0.105	0.005K	0.035

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

3619D1 LS3619D1
43 59 30.0 074 24 00.0
UNNAMED CREEK
36 15 BLUE MTN
T/LONG LAKE(HAMILTON CO)
BANK OF DIRT RD NEAR OVEN POINT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	13 00		0.104	0.250	0.046	0.005K	0.007
72/12/02	11 00		0.460	0.730	0.048	0.005K	0.005K
73/01/05	10 25		0.450	0.300	0.007	0.005K	0.005K
73/02/06	10 10		0.540	0.400	.024	0.005K	0.060
73/03/04	10 00		0.390	1.830	0.189	0.005K	0.010
73/03/31	15 15		0.380	0.380	0.022	0.005K	0.010
73/04/15	10 00		0.330	1.100	0.052	0.005K	0.015
73/05/05	11 00		0.294	1.000	0.018	0.005K	0.005K
73/05/18	19 00		0.270	0.640	0.019	0.005K	0.010
73/06/03	11 00		0.250	1.320	0.042	0.005K	0.005K
73/07/14	15 00		0.126	0.520	0.024	0.005K	0.020
73/08/19	14 00		0.042	0.660	0.030	0.005K	0.015
73/09/07	17 00		0.071	1.980	0.670	0.005K	0.010
73/10/13	10 30		0.074	1.150	0.460	0.005K	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

3619E1 LS3619E1
44 00 00.0 074 29 00.0
BIG BROOK
36 15 LONG LAKE
T/LONG LAKE(HAMILTON CO)
ST HWY 10 BRDG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	16 00		0.091	0.340	0.063	0.005K	0.007
72/12/02	11 30		0.150	0.720	0.038	0.005K	0.005K
73/01/05	14 00		0.315	0.440	0.039	0.005K	0.010
73/02/06	10 30		0.380	0.230	0.038	0.005K	0.010
73/03/04	11 00		0.430	0.370	0.061	0.005K	0.010
73/04/01	10 00		0.378	0.520	0.019	0.005K	0.020
73/04/15	10 15		0.320	0.880	0.050	0.005K	0.005K
73/05/05	11 00		0.010K	0.560	0.011	0.005K	0.005K
73/05/18	19 00		0.190	0.580	0.016	0.005K	0.010
73/06/03	14 00		0.231	1.400	0.029	0.005K	0.010
73/07/14	09 00		0.046	0.540	0.066	0.005K	0.015
73/08/19	15 00		0.044	1.600	0.054	0.005K	0.010
73/09/07	16 00		0.036	1.850	0.840	0.005K	0.015
73/10/13	10 00		0.066	1.320	0.590	0.006	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

3619F1 LS3619F1
44 05 30.0 074 16 00.0
COLD RIVER
36 15 LONG LAKE
T/LONG LAKE(HAMILTON CO)
WOLF LAKE RD BRDG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	14 35		0.480	0.120	0.034	0.005K	0.005K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

361961 LS361961
44 04 00.0 074 15 30.0
PINE BROOK
36 15 LONG LAKE
T/LONG LAKE(HAMILTON CO)
WOLF LAKE RD BRDG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	15 00		0.199	0.325	0.053	0.005K	0.007

K VALUE KNOWN TO BE
LESS THAN INDICATED